

**R-009-203.8**

**2404**

**REVISED GROUNDWATER CONTAMINATION  
PLUME REMOVAL ACTION ENGINEERING  
EVALUATION/COST ANALYSIS (EE/CA)  
ADDENDUM**

**11/07/91**

**DOE-291-92  
DOE-FO/EPA  
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LETTER**



**Department of Energy**  
**Fernald Environmental Management Project**  
P.O. Box 398705  
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DOE-291-92

Mr. James A. Saric, Remedial Project Director  
U. S. Environmental Protection Agency  
Region V - 5HR-12  
230 South Dearborn Street  
Chicago, Illinois 60604

Mr. Graham E. Mitchell, DOE Coordinator  
Ohio Environmental Protection Agency  
40 South Main Street  
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

**REVISED GROUNDWATER CONTAMINATION PLUME REMOVAL ACTION ENGINEERING EVALUATION/  
COST ANALYSIS (EE/CA) ADDENDUM**

- References:
- 1) Letter, DOE-2259-91, J. R. Craig to J. A. Saric and G. E. Mitchell, "South Groundwater Contamination Plume Removal Action EE/CA Addendum," dated September 19, 1991
  - 2) Letter, G. E. Mitchell to J. R. Craig, "South Plume EE/CA Addendum," dated September 25, 1991
  - 3) Letter, J. A. Saric to J. R. Craig, "U.S. EPA Comments on the Addendum to the South Plume Removal Action EE/CA," dated October 23, 1991

Enclosure 1 is the revision to the South Groundwater Contamination Plume Removal Action EE/CA Addendum. The revisions are highlighted to identify changes made to the original draft issue of the document. The enclosed revision includes modifications that reflect the responses to the Ohio EPA's comments (Reference 2) and U.S. EPA's comments (Reference 3). Responses to Ohio EPA's comments are included as Enclosure 2 and responses to U.S. EPA's comments are included as Enclosure 3.

It is intended that the enclosed EE/CA addendum will be made available to the public for a 30-day public comment period. However, the Notice of Availability (NOA) will not be issued until concurrence is received from U.S. EPA and Ohio EPA. Therefore, it is imperative that you review the enclosed material and issue approval to proceed with the NOA.

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Because of the importance of this effort, please review and provide a response to my office by November 15, 1991.

If you or your staff have any questions or comments, please contact Carlos J. Fermaintt at (513) 738-6157 or FTS 774-6157 or myself at FTS 738-6159 or FTS 774-6159.

Sincerely,



*for* Jack R. Craig  
Fernald Remedial Action  
Project Manager

FO:Fermaintt

Enclosures: As Stated

cc w/encls.:

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cc w/o encls.:

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*AS*

## ADDENDUM TO SOUTH GROUNDWATER CONTAMINATION PLUME REMOVAL ACTION EE/CA

This addendum is to document recent events which have occurred on portions of the South Groundwater Contamination Plume Removal Action (South Plume) project. The events have necessitated a restructuring of Parts 2 and 3 of the EE/CA, and the addition of a Part 5, as described in the following paragraphs.

The scope of the original EE/CA, dated November 1990 and agreed to by USEPA and Ohio EPA, was defined as management of radioactively contaminated groundwater in an area south of the Fernald Environmental Management Project (FEMP) property boundary [Note - The facility name was recently changed from the Feed Materials Production Center (FMPC) to FEMP due to the changing of the mission at the site from production to environmental restoration.] The fundamental objective of the removal action was to protect public health by limiting access to, and use, of groundwater with uranium concentrations exceeding the derived concentration limit of 30 ug/l for uranium in drinking water. Additionally, secondary objectives formulated for the South Plume Removal Action included:

- Protection of the groundwater environment, which, in this case, is represented by a sensitive sole-source aquifer
- Control of plume migration toward additional receptors farther south

Based on these identified objectives and an evaluation of remedial alternatives, an alternative was selected that most comprehensively satisfied the evaluation criteria. The selected alternative included groundwater pumping and discharge with installation of an "interim" 150 gpm Advanced Wastewater Treatment system (IAWWT) to remove a greater than equivalent mass of uranium from an existing FEMP discharge so that the mass of uranium currently discharged is not exceeded, but is indeed reduced to a level not to exceed 1700 pounds per year (baseline was 1862 pounds per year).

Further migration of the uranium contamination was being addressed by installing recovery wells to extract groundwater at the leading edge of the plume, ahead of the 30 ug/l isopleth. As a result of information obtained recently from a separate remedial investigation that is being performed at the Paddys Run Road Site (PRRS), additional concerns have been identified in the South Plume area. The PRRS consists of several industries (e.g. Albright & Wilson Americas Inc., Ruetgers and Nease Chemical Co., and Mobil Mining and Minerals Co.) that, over the past years, have reportedly released both organics and inorganics into the environment which have now found their way to the Great Miami aquifer. Some of these contaminants include cumene, toluene, benzene, arsenic, mercury, and others. The area that the PRRS plume has been determined to extend to is very near the location of the Part 2 well field as described in the November 1990 South Plume EE/CA.

Therefore, operation of a uranium recovery well field at the location originally described could result in the extraction and discharge of PRRS contaminants and could result in the further spreading of the PRRS contaminants. Capturing of the PRRS contaminants during the removal action phase would require the construction of facilities to address treatment of both organics and inorganics prior to discharge to the Great Miami River (the IAWWT will only address the discharge of uranium). Constructing permanent (minimum 25 year life expectancy) treatment facilities to address these contaminants in a projected discharge of 2000 gallons per minute would be a major effort. This effort would result in delaying the beginning of the pumping operation for several years.

As a result of these conditions, it has been deemed necessary to relocate the Part 2 well field to an area north of the PRRS. Modeling efforts have been performed to determine a location where pumping of the recovery well field will not significantly affect the PRRS plume and will not draw PRRS contaminants into the recovery well field. Figure 1 depicts the new location of the South Plume Removal Action Part 2 well field.

This relocation of the Part 2 well field has generated several additional requirements. The new location is in an area of higher uranium concentration which would jeopardize the equivalent mass treatment concept as described in the November 1990 revision of the EE/CA. Accordingly, the Part 3 IAWWT system will be increased in capacity to provide the additional treatment necessary to meet the previously agreed to 1700 pounds per year uranium discharge level.

In addition, the relocated well field is upgradient of an area where sampling data (e.g. monitoring wells 2546 and 2626) has indicated the concentration of uranium to be above 30 ug/l. The computer model for the South Plume predicts that other areas could also exist where the level of uranium concentration is above 30 ug/l. Therefore, an additional investigation will be performed under a new Part 5 of the South Plume Removal Action. The Part 5 investigation will include hydropunching, installation of additional monitoring wells, sampling of monitoring wells and a soil vapor survey of the area south of the well field near New Haven Road (Figure 2). The investigation will identify the location of the 30 ug/l uranium isopleth. Because the EPA has recently issued a proposed revised limit of 20 ug/l for uranium in drinking water, the investigation will also identify the location of the 20 ug/l isopleth. The information obtained will be used to allow the FEMP to limit access to this water until additional response action(s) for this area can be implemented.

Currently, it is envisioned that the remediation of the South Plume will be addressed by dividing the area into three zones. The purpose of the zones are to distinguish the areas of contamination for purposes of treatment. The zones are as follows:

- Zone 1 would be the area of aquifer containing only uranium as the contaminant of concern. This will be the area addressed by the South Plume Removal Action project described in the EE/CA, as modified above.

- Zone 2 would be the area of aquifer containing uranium, inorganics, and organics as contaminants of concern. This area will need to be addressed jointly by FEMP and the PRRS.
- Zone 3 would include inorganics and organics as contaminants of concern. The area may also contain uranium contamination, but at a concentration below the cleanup level that will be specified in the FEMP Operable Unit 5 ROD. This area will need to be addressed solely by the PRRS, but will need to be coordinated with FEMP efforts for Zones 1 and 2.

In addition, the existing FEMP effluent pipeline to the Great Miami River (GMR) has been evaluated as part of Operable Unit (OU) 3 for structural integrity and capacity to accept additional discharge. It has been determined that, due to the age and uncertainties associated with the existing effluent pipeline downstream of the proposed Part 2 pipeline tie-in, the portion of the existing effluent pipeline downstream of the Part 2 pipeline tie-in will be abandoned and a new portion of effluent pipeline will be installed as part of OUS and incorporated into Part 2 of the South Groundwater Contamination Plume Removal Action (see Figure 3). The new effluent pipeline will begin at a location approximately fifty feet south of existing Manhole 176 and will parallel the existing effluent pipeline to the GMR. Future flow passing through the existing National Pollutant Discharge Elimination System (NPDES) monitoring point at Manhole 175 will be diverted from the existing effluent pipeline near Manhole 176 and flow to a new Manhole 176B located at the upstream end of the new effluent pipeline. The flow from the South Plume Part 2 recovery well field will be monitored as a new NPDES discharge and will also join the new effluent pipeline at Manhole 176B. Other than short term construction impacts, the installation of the new effluent pipeline will not adversely affect the GMR as the mass of uranium discharged will not be increased, but in fact will actually be decreased from 1862 pounds per year to 1700 pounds per year. The only effect of the effluent pipeline relocation will be to move the point of effluent discharge to the GMR slightly downstream from the existing point of effluent discharge. Therefore, cumulative impacts from the project will not adversely affect the environment.

Parts 1, 2, and 5 of the South Plume Removal Action will result in some minor disturbances to the 100-year floodplain of the GMR. Therefore, pursuant to the requirements of 10 CFR 1022, "Regulations for Compliance with Floodplains/Wetlands Environmental Review Requirements," DOE published a Notice of Floodplain Involvement in the Federal Register. Following the Notice of Floodplain Involvement, a Floodplain Assessment was prepared to assess the impacts of the South Plume Removal Action on the 100-year floodplain.

The Floodplain Assessment described the impacts to the floodplain as follows. Part 1 will involve the installation of an underground pipeline from a series of water supply wells (located outside the floodplain) to two industrial users affected by the South Contaminated Groundwater Plume. A portion of this pipeline will be installed in the 100-year floodplain of the GMR. This will result in only temporary disturbances during installation and no permanent structures will be installed within the floodplain. Part 2 will involve the installation of a series of recovery and monitoring wells, a transfer pump station, a discharge pipeline, and a new effluent pipeline. The recovery and monitoring wells, the

transfer pump station, and a portion of the discharge and effluent pipelines will be installed in the 100-year floodplain. Only the Cofferdam Structure, including rip-rap 100 feet north and 100 feet south of the new outfall line, the transfer pump station and the recovery and monitoring wells will be permanent structures installed within the floodplain. Part 5 involves conducting hydropunch sampling and soil vapor surveys in a portion of the 100-year floodplain. This will result in only temporary disturbances during sampling and no permanent structures will be installed in the floodplain.

It was determined from the Floodplain Assessment that less than 1.0 acre of floodplain will be permanently elevated as a result of the South Plume Removal Action. In addition, this action will result in the temporary disturbance of only 8.8 acres of the 100-year floodplain during construction activities. This disturbed area corresponds to only 0.55% of the 100-year floodplain between river mile 19 and 24 of the GMR. Based on the amount of area disturbed, it was determined that the South Plume Removal Action will have no significant impact on the 100-year floodplain of the GMR. Therefore, DOE is issuing a Floodplain Statement of Findings summarizing the information in the Floodplain Assessment for publication in the Federal Register. The publication will remain for fifteen days prior to commencement of any construction.

The specific sections of the November 1990 revision of the EE/CA which require modification because of the addition of Part 5 and the restructuring of Parts 2 and 3, can be found as Attachment 1.

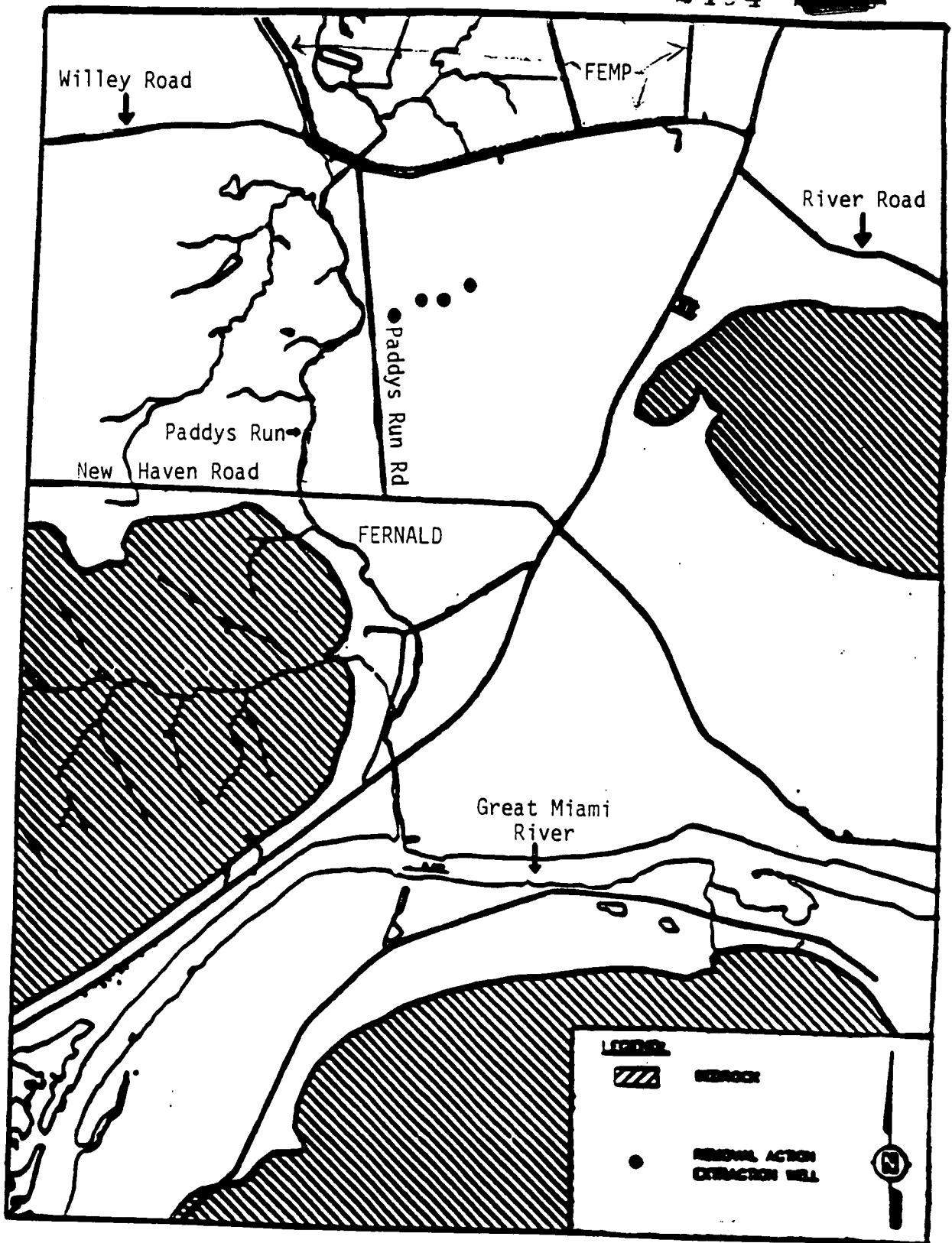


FIGURE 1  
New location of Recovery  
Well Field



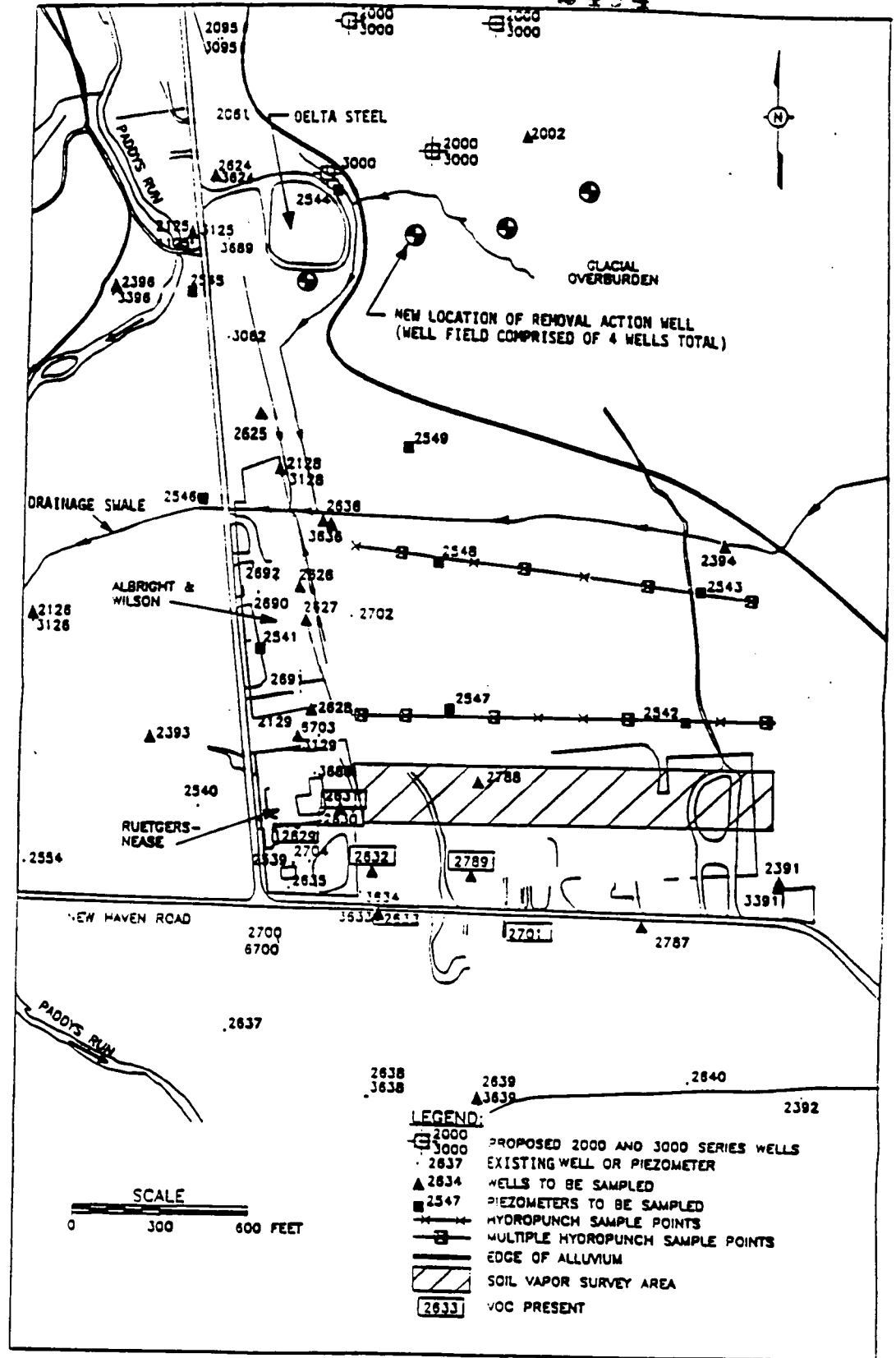
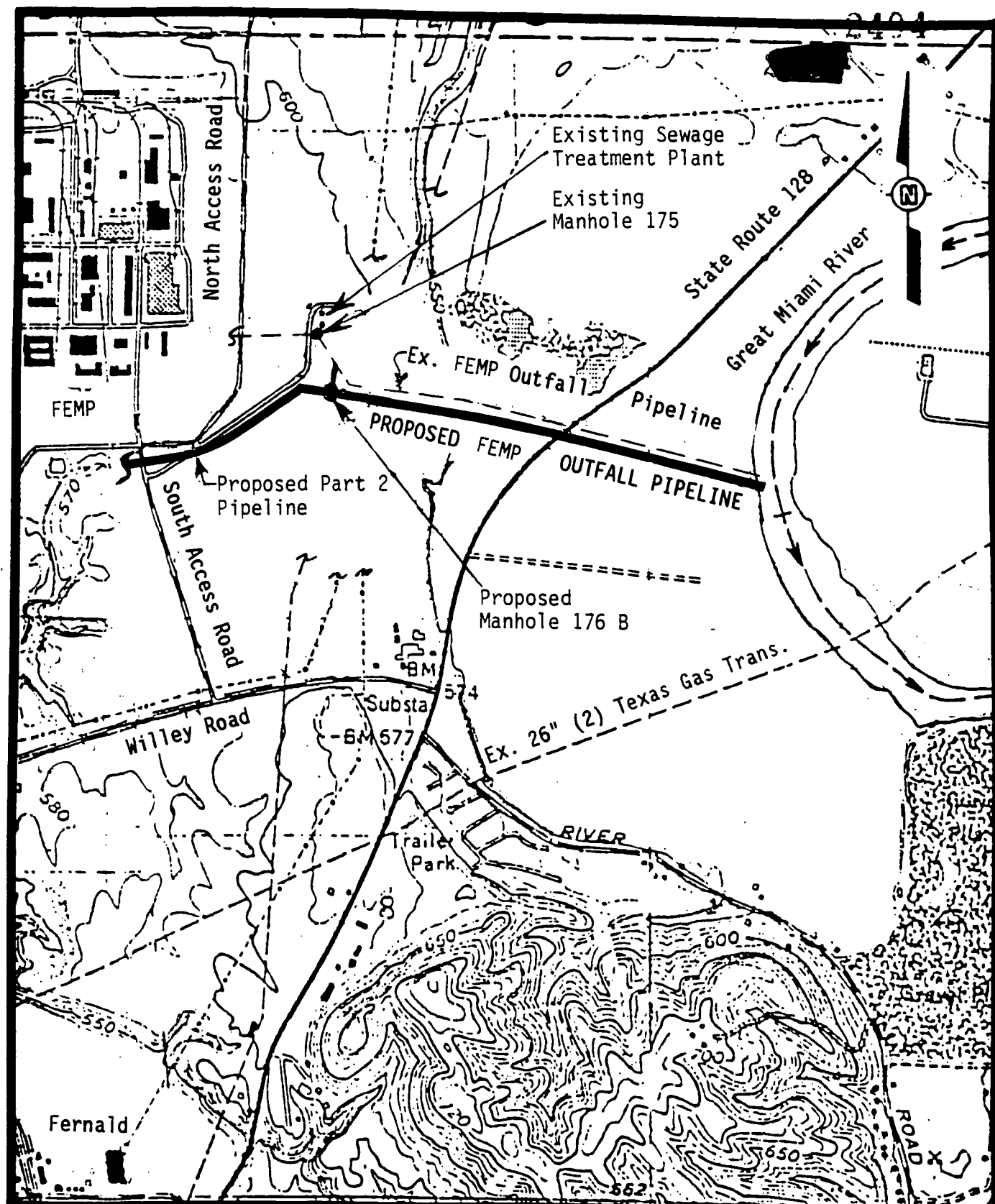


FIGURE 2 PROPOSED SAMPLING LOCATIONS FOR PART 5



0 1000 2000 FEET  
GRAPHIC SCALE

Figure 3 FEMP Outfall Pipeline Site Plan

## Attachment 1

Listed below are specific sections of the November 1990 revision of the EE/CA which require modification because of the addition of Part 5 and the restructuring of Parts 2 and 3. As the preceeding EE/CA Addendum was prepared to supplement the November 1990 EE/CA, it is intended that the addendum be the overriding document for any other inconsistencies which may still exist but are not noted below.

**General:** Since the EE/CA was written, the name of the DOE facility has been changed from the Feed Materials Production Center (FMPC) to the Fernald Environmental Management Project (FEMP). The name was changed to better reflect the new mission of the facility. Please be aware that all the figures that are found in the November, 1990 EE/CA identifying the location of the extraction wells near New Haven Road are now invalid. The new location is identified in Figure 1 of this EE/CA addendum. The figures in the existing EE/CA will not be revised.

Throughout the EE/CA, statements are made that pumping will be targeted at the leading edge of the plume. It should be clarified that the leading edge is defined as the location of the 30 ug/l uranium isopleth; however, with the relocation of the well field, pumping will occur in an area with concentrations greater than 30 ug/l. However, sufficient treatment will be installed as part of this addendum to address the equivalent mass removal of uranium which results from the relocation of the well field.

**Page ES-6:** Paragraph 4 (Bullet 4) reads: Groundwater Pumping and Discharge, Equivalent Uranium Removal from Existing FMPC Wastewater Discharges, Alternate Water Supply and Groundwater Monitoring and Institutional Controls (referred to hereafter as Pump and Treat).

Paragraph 4 (Bullet 4) is modified to read: Groundwater Pumping and Discharge, Equivalent Uranium Removal from Existing FEMP Wastewater Discharges, Alternate Water Supply and Groundwater Monitoring and Institutional Controls (referred to hereafter as Pump and Treat), Groundwater Modeling and Geochemical Investigation.

**Page 4-1:** Paragraph 1 (Bullet 4) reads: Groundwater Pumping and Discharge, Equivalent Uranium Removal from Existing FMPC Wastewater Discharges, Alternate Water Supply and Groundwater Monitoring and Institutional Controls (subsequently referred to as Pump and Treat).

Paragraph 1 is modified to read: Groundwater Pumping and Discharge, Equivalent Uranium Removal from Existing FEMP Wastewater Discharges, Alternate Water Supply and Groundwater Monitoring and Institutional Controls (subsequently referred to as Pump and Treat), Groundwater Modeling and Geochemical Investigation.

Page 4-5: Paragraph 3, Sentence 2 reads: The system will process approximately 150 gallons per minute of existing plant effluent and remove a quantity of uranium greater than the quantity of uranium that will be released to the Great Miami River as a result of the extraction and discharge of groundwater from the South Plume and various other removal actions.

Paragraph 3, Sentence 2 is modified to read: The system will provide treatment to remove a quantity of uranium greater than the quantity of uranium that will be released to the Great Miami River as a result of the extraction and discharge of groundwater from the South Plume and various other removal actions.

Page 4-5: Paragraph 4, 1st Sentence reads: Three to five recovery wells are tentatively planned for installation just south of New Haven Road to intercept the plume.

Paragraph 4, 1st Sentence is modified to read: Three to five recovery wells are tentatively planned for installation north of the Albright & Wilson Americas (AWA) Plant. The recovery wells are shown conceptually in Figure 1 of this Addendum.

Page 5-16: Paragraph 1, 3rd Sentence reads: An interim 150 gpm advanced wastewater treatment facility will be installed to remove uranium from existing FMPC wastewater discharges.

Paragraph 1, 3rd Sentence is modified to read: An Interim Advanced Wastewater Treatment (IAWWT) system will be installed to remove uranium from existing FEMP discharges.

Page 5-16: Paragraph 2, beginning with 3rd Sentence reads: The effect of pumping will increase the total mass loading of uranium with time as the plume moves southward toward the recovery wells (Figure A-10 and A-11). However, with the treatment of a more concentrated effluent stream from the FMPC, it is estimated that the annual uranium loading to the river will decrease from its current level of 556 mCi (1862 pounds) to 487 mCi (1602 pounds) during the first year of pumping. With the varying loading of uranium due to pumping, the annual net loading to the river will increase to 499 mCi (1642 pounds) during the second year and 511 mCi (1682 pounds) during the third year.

Paragraph 2, beginning with 3rd Sentence is modified to read: With the treatment of a more concentrated effluent stream from the FEMP, the annual uranium loading to the river will decrease from its current level of 556 mCi (1862 pounds) to a level less than 517 mCi (1700 pounds).

Page 5-17: Paragraph 3, 1st Sentence reads: This alternative, which includes groundwater pumping and discharge along with treatment of 150 gpm of the FEMP effluent, meets the secondary removal action objective of

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the protection of the groundwater environment to a limited extent.

Paragraph 3, 1st Sentence is modified to read: This alternative, which includes groundwater pumping and discharge along with treatment of the FEMP effluent, meets the secondary removal action objective of the protection of the groundwater environment to a limited extent.

Page 5-17: Paragraph 3, 2nd Sentence reads: The positioning of the recovery wells near the southern edge of the plume is minimally effective in reducing environmental concentrations over the short term.

Paragraph 3, 2nd Sentence is modified to read: The position of the recovery wells north of AWA is expected is minimally effective in reducing environmental concentrations over the short term.

Page 5-18: Paragraph 6, 1st Sentence reads: Under this alternative, a 150 gpm advanced wastewater treatment facility will be installed to remove a mass of uranium from the FEMP effluent greater than the average mass of uranium pumped from the south plume and other removal actions, as mentioned previously, into the Great Miami River.

Paragraph 6, 1st Sentence is modified to read: Under this alternative, a treatment system will be installed to remove a greater than equivalent mass of uranium from existing FEMP effluent greater than the average mass of uranium pumped from the south plume and other removal actions, as mentioned previously, into the Great Miami River.

Page 5-19: Paragraph 1, 1st Sentence reads: The total mass of uranium released via the effluent pipeline will not exceed the existing FEMP release value.

Paragraph 1, 1st Sentence is modified to read: The total mass of uranium released via the new effluent pipeline will not exceed the existing FEMP release value.

Page 6-3: Paragraph 3, 3rd Sentence reads: Based on the previous discussions, this is shown to be Alternative 4, which includes groundwater pumping and discharge, an alternate water supply for two currently affected industrial users, installation of an interim 150 gpm advanced wastewater treatment system, and enhanced monitoring and institutional control.

Paragraph 3, 3rd Sentence is modified to read: Alternative 4, which includes groundwater pumping and discharge, an alternate water supply for two concurrently affected industrial users, installation of a treatment system for addressing the increased uranium loading, and enhanced monitoring and institutional controls

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Page 6-3: Paragraph 4, 6th Sentence reads: The installation of the 150 gpm advanced wastewater treatment system as part of Alternative 4 is cost effective, technically efficient in preventing an increase in uranium discharged to the Great Miami River, and can be installed in a timely manner.

Paragraph 4, 6th Sentence is modified to read: The installation of the treatment system sufficient for handling the increased uranium loading as part of Alternative 4 is cost effective, technically efficient in preventing an increase in uranium discharged to the Great Miami River, and can be installed in a timely manner.

Page 8-5: The cost estimate for the "Interim" Advanced Wastewater Treatment System reads: \$1,200,000.

The cost estimate is modified to: \$3,000,000